

## **Claims**

What is claimed is:

1. A customizable aggregated musical instrument comprising:  
a plurality of individual musical modules, wherein each musical module of said plurality of individual musical modules generates an electrical signal in response to user operation of said individual musical module;  
a mounting frame securing said plurality of individual musical modules in a reconfigurable mounting arrangement, wherein each musical module of said plurality of individual musical modules is readily positionable within any of a plurality of mounting locations of said mounting frame; and  
at least one instrument interface adapted to transmit interface signals to an external system, wherein said interface signals are generated in response to one or more of said electrical signals generated by said plurality of individual musical modules.
2. The musical instrument according to claim 1, wherein said mounting frame is substantially planar facilitating a linear arrangement of said plurality of individual musical modules.
3. The musical instrument according to claim 1, wherein said mounting frame comprises a plurality of tiers, wherein each tier of said plurality of tiers has a different height relative to adjacent tiers, and wherein each tier of said plurality of tiers secures at least one musical module of said plurality of individual musical modules.
4. The musical instrument according to claim 1, wherein at least a portion of said mounting frame is curved.
5. The musical instrument according to claim 1, wherein said mounting frame comprises a rotating mounting arrangement rotatably attached to an instrument body.

6. The musical instrument according to claim 1, wherein said mounting frame comprises a rotating mounting arrangement rotatably mounted in a second mounting frame.

7. The musical instrument according to claim 5, wherein said plurality of individual musical modules is implemented using at least three musical modules.

8. The musical instrument according to claim 1, wherein said mounting frame is adapted to receive a shoulder strap.

9. The musical instrument according to claim 1, wherein said mounting frame is adapted to receive a floor stand.

10. The musical instrument according to claim 1, said musical instrument further comprising:

a signal routing infrastructure associated with said mounting frame, wherein said signal routing infrastructure facilitates signal communication required by said at least one instrument interface and each music module of said plurality of individual musical modules.

11. The musical instrument according to claim 10, wherein said signal routing infrastructure is configured to communicate audio signals.

12. The musical instrument according to claim 10, wherein said signal routing infrastructure is configured to communicate control signals.

13. The musical instrument according to claim 12, wherein said control signals are signals of MIDI format.

14. The musical instrument according to claim 10, wherein said signal routing infrastructure is configured to communicate video signals.

15. The musical instrument according to claim 10, wherein said signal routing infrastructure is configured to communicate computer data signals.

16. The musical instrument according to claim 10, wherein at least one of said interface signals comprises an outgoing audio signal.

17. The musical instrument according to claim 10, wherein at least one of said interface signals comprises an outgoing control signal.

18. The musical instrument according to claim 17, wherein said outgoing control signal is a signal of MIDI format.

19. The musical instrument according to claim 10, wherein at least one of said interface signals comprises an outgoing video signal.

20. The musical instrument according to claim 10, wherein at least one of said interface signals comprises an outgoing computer data signal.

21. The musical instrument according to claim 10, wherein said at least one instrument interface is further adapted to receive an incoming audio signal.

22. The musical instrument according to claim 10, wherein said at least one instrument interface is further adapted to receive an incoming control signal.

23. The musical instrument according to claim 10, wherein said at least one instrument interface is further adapted to receive an incoming video signal.

24. The musical instrument according to claim 10, wherein said at least one instrument interface is further adapted to receive an incoming computer data signal.

25. The musical instrument according to claim 10, wherein said at least one instrument interface is a generalized instrument interface.

26. The musical instrument according to claim 10, said musical instrument further comprising:

an audio signal processing element for processing one or more signals communicated by said signal routing infrastructure.

27. The musical instrument according to claim 10, said musical instrument further comprising:

an audio signal mixing element for mixing one or more signals communicated by said signal routing infrastructure.

28. The musical instrument according to claim 10, said musical instrument further comprising:

an audio signal switching element for switching one or more signals communicated by said signal routing infrastructure.

29. The musical instrument according to claim 10, said musical instrument further comprising:

an audio sound production element for producing audio sounds based upon one or more signals communicated by said signal routing infrastructure.

30. The musical instrument according to claim 29, wherein said audio sound production element produces at least two audio channels.

31. The musical instrument according to claim 29, wherein said audio sound production element is configured within a speaker enclosure, wherein said audio sound production element comprises a double-integrator signal processor producing audio frequencies below the resonant frequency of said speaker enclosure.

32. The musical instrument according to claim 10, said musical instrument further comprising:

a conversion element for converting an audio signal communicated by said signal routing infrastructure to a control signal.

33. The musical instrument according to claim 10, said musical instrument further comprising:

a control signal processing element for processing one or more signals communicated by said signal routing infrastructure.

34. The musical instrument according to claim 10, said musical instrument further comprising:

a control signal merging element for merging two or more signals communicated by said signal routing infrastructure.

35. The musical instrument according to claim 10, said musical instrument further comprising:

a control signal switching element for switching one or more control signals communicated by said signal routing infrastructure.

36. The musical instrument according to claim 10, said musical instrument further comprising:

a controllable audio signal synthesizer element for converting one or more control signals communicated by said signal routing infrastructure into an audio signal.

37. The musical instrument according to claim 10, said musical instrument further comprising:

a video signal processing element for processing one or more video signals communicated by said signal routing infrastructure.

38. The musical instrument according to claim 10, said musical instrument further comprising:

a video signal combining element for combining two or more video signals communicated by said signal routing infrastructure.

39. The musical instrument according to claim 38, wherein said signal combining element performs a video screen-split operation on said two or more video signals.

40. The musical instrument according to claim 38, wherein said signal combining element performs a video mosaic operation on said two or more video signals.

41. The musical instrument according to claim 38, wherein said signal combining element performs a video blending operation on said two or more video signals.

42. The musical instrument according to claim 38, wherein said signal combining element performs a video fading operation on said two or more video signals.

43. The musical instrument according to claim 10, said musical instrument further comprising:

a video signal switching element for switching one or more video signals communicated by said signal routing infrastructure.

44. The musical instrument according to claim 10, said musical instrument further comprising:

a conversion element for converting one or more video signals communicated by said signal routing infrastructure into a control signal.

45. The musical instrument according to claim 10, said musical instrument further comprising:

a controllable video signal synthesizer element for converting one or more control signals communicated by said signal routing infrastructure into a video signal.

46. The musical instrument according to claim 1, wherein at least one of said plurality of individual musical modules is configured as a stringed instrument module having at least one vibrating element.

47. The musical instrument according to claim 46, wherein said at least one vibrating element is a vibrating string.

48. The musical instrument according to claim 47, wherein said stringed instrument module comprises a plurality of strings and an unfretted neck.

49. The musical instrument according to claim 47, wherein said stringed instrument module comprises a plurality of sympathetic strings.

50. The musical instrument according to claim 46, wherein a drive transducer provides stimulation to said vibrating element.

51. The musical instrument according to claim 1, said musical instrument further comprising:

an electronic controller module secured within one of said plurality of mounting locations of said mounting frame, and wherein said electronic controller module comprises a user interface element for producing at least one control signal in response to user operation of said user interface element.

52. The musical instrument according to claim 51, wherein said user interface element comprises a keyboard.

53. The musical instrument according to claim 51, wherein said user interface element comprises a hand-operated tactile control pad.

54. The musical instrument according to claim 53, wherein said hand-operated tactile control pad is a null/contact touchpad.

55. The musical instrument according to claim 53, wherein said hand-operated tactile control pad includes a top side and a bottom side, said top side defining an area for operating said hand-operated tactile control pad, and wherein

a pressure sensor is coupled to said bottom side of said hand-operated tactile control pad, wherein said pressure sensor generates at least one of said at least one control signal responsive to the relative pressure that a user contacts said hand-operated tactile control pad.



56. The musical instrument according to claim 53, wherein said hand-operated tactile control pad includes a top side and a bottom side, said top side defining an area for operating said hand-operated tactile control pad, and wherein

an impact sensor is coupled to said bottom side of said hand-operated tactile control pad, wherein said impact sensor generates at least one of said at least one control signal responsive to an impact received at said hand-operated tactile control pad.

57. The musical instrument according to claim 53, wherein said hand-operated tactile control pad comprises a pressure-sensor array.

58. The musical instrument according to claim 51, wherein said user interface element comprises a strumpad.

59. The musical instrument according to claim 58, wherein said strumpad includes a top side and a bottom side, said top side defining an area for operating said strumpad, and wherein

an impact sensor is coupled to said bottom side of said strumpad, wherein said impact sensor generates at least one of said at least one control signal responsive to an impact received at said strumpad.

60. The musical instrument according to claim 51, wherein said user interface element comprises a switch.

61. The musical instrument according to claim 51, wherein said user interface element comprises a pushbutton.

62. The musical instrument according to claim 51, wherein said user interface element comprises a slider.

63. The musical instrument according to claim 51, wherein said user interface element comprises a ribbon controller.

64. The musical instrument according to claim 51, wherein said user interface element comprises an impact sensor.

65. The musical instrument according to claim 1, said musical instrument further comprising:

a novelty module secured within one of said plurality of mounting locations of said mounting frame.

66. The musical instrument according to claim 1, said musical instrument further comprising:

a novelty module secured within one of said plurality of mounting locations of said mounting frame, wherein said novelty module comprises an electrical interface for receiving incoming control signals.

67. The musical instrument according to claim 66, wherein said novelty module comprises at least one lighting element operating in response to said incoming control signals.

68. The musical instrument according to claim 66, wherein said novelty module comprises a visual display operating in response to said incoming control signals.

69. The musical instrument according to claim 68, wherein said visual display comprises a video display.

70. The musical instrument according to claim 68, wherein said visual display comprises a computer display.

71. The musical instrument according to claim 68, wherein said visual display comprises a custom pattern generating display.

72. The musical instrument according to claim 68, wherein said visual display comprises a motion or still-image projection display.

73. The musical instrument according to claim 66, wherein said novelty module comprises a special effects element operating in response to said incoming control signals.

74. The musical instrument according to claim 73, wherein said special effects element comprises a fog generator.

75. The musical instrument according to claim 73, wherein said special effects element comprises a bubbling fluid element.

76. The musical instrument according to claim 73, wherein said special effects element comprises a swirling fluid element.

77. The musical instrument according to claim 73, wherein said special effects element comprises a electrical discharge element.

78. The musical instrument according to claim 66, wherein said novelty module comprises a chemical reaction vessel controlled by said incoming control signals.

79. The musical instrument according to claim 1, said musical instrument further comprising:

a novelty module secured within one of said plurality of mounting locations of said mounting frame, wherein said novelty module comprises an electrical interface for providing outgoing control signals.

80. The musical instrument according to claim 79, wherein said novelty module comprises a video camera that generates said outgoing control signals.

81. The musical instrument according to claim 79, wherein said novelty module comprises a user interface element that generates said outgoing control signals, wherein said outgoing control signals are adapted to control an external computer.

82. The musical instrument according to claim 81, wherein said user interface element is a trackball.

83. The musical instrument according to claim 81, wherein said user interface element is a game controller.

84. The musical instrument according to claim 1, said musical instrument further comprising:

a hierarchical frame module secured within one of said plurality of mounting locations of said mounting frame; wherein

said hierarchical frame module secures a plurality of small-scale musical modules in a reconfigurable mounting arrangement, wherein each musical module of said plurality of small-scale musical modules is readily positionable within any of a plurality of mounting locations of said hierarchical frame module; and wherein

each musical module of said plurality of small-scale musical modules generates an electrical signal in response to user operation of said small-scale musical module.

85. The musical instrument according to claim 84, wherein at least one of said plurality of small-scale musical modules is configured as a stringed instrument module having at least one vibrating element.

86. The musical instrument according to claim 85, wherein said at least one vibrating element is a vibrating string.

87. The musical instrument according to claim 85, wherein said at least one vibrating element is a vibrating tyne.

88. The musical instrument according to claim 84, wherein at least one of said plurality of small-scale musical modules comprises a tuned chime bar.

89. The musical instrument according to claim 84, wherein at least one of said plurality of small-scale musical modules comprises a tuned chime tube.

90. The musical instrument according to claim 84, wherein at least one of said plurality of small-scale musical modules comprises a tuned cymbal.

91. The musical instrument according to claim 84, wherein at least one of said plurality of small-scale musical modules comprises a small-scale electronic controller module secured within one of said plurality of mounting locations of said hierarchical frame module, and wherein said small-scale electronic controller module comprises a user interface element for producing at least one electronic control signal.

92. The musical instrument according to claim 91, wherein said user interface element comprises a keyboard segment.

93. The musical instrument according to claim 91, wherein said user interface element comprises a plurality of keyboard segments.

94. The musical instrument according to claim 91, wherein said user interface element comprises a hand-operated tactile control pad.

95. The musical instrument according to claim 94, wherein said hand-operated tactile control pad is a null/contact touchpad.

96. The musical instrument according to claim 94, wherein said hand-operated tactile control pad includes a top side and a bottom side, said top side defining an area for operating said hand-operated tactile control pad, and wherein

a pressure sensor is coupled to said bottom side of said hand-operated tactile control pad, wherein said pressure sensor generates at least one of said at least one control signal responsive to the relative pressure that a user contacts said hand-operated tactile control pad.

97. The musical instrument according to claim 94, wherein said hand-operated tactile control pad includes a top side and a bottom side, said top side defining an area for operating said hand-operated tactile control pad, and wherein

an impact sensor is coupled to said bottom side of said hand-operated tactile control pad, wherein said impact sensor generates at least one of said at least one control signal responsive to an impact received at said hand-operated tactile control pad.

98. The musical instrument according to claim 94, wherein said hand-operated tactile control pad comprises a pressure-sensor array.

99. The musical instrument according to claim 91, wherein said user interface element comprises a strumpad.

100. The musical instrument according to claim 99, wherein said strumpad includes a top side and a bottom side, said top side defining an area for operating said strumpad, and wherein

an impact sensor is coupled to said bottom side of said strumpad, wherein said impact sensor generates at least one of said at least one control signal responsive to an impact received at said strumpad.

101. The musical instrument according to claim 91, wherein said user interface element comprises a switch.

102. The musical instrument according to claim 91, wherein said user interface element comprises a pushbutton.

103. The musical instrument according to claim 91, wherein said user interface element comprises a slider.

104. The musical instrument according to claim 91, wherein said user interface element comprises a ribbon controller.

105. The musical instrument according to claim 91, wherein said user interface element comprises an impact sensor.

106. The musical instrument according to claim 1, said musical instrument further comprising:

an electrical power distribution infrastructure associated with said mounting frame, wherein said electrical power distribution infrastructure provides needed electrical power to at least one musical module of said plurality of individual musical modules via a separate electrical power interface associated with each of said at least one musical module requiring electrical power.

107. The musical instrument according to claim 106, wherein said electrical power distribution infrastructure comprises a separate power distribution decoupling filter configured with said separate electrical power interface associated with at least one of said at least one musical module requiring electrical power.

108. The musical instrument according to claim 106, wherein said electrical power distribution infrastructure comprises a separate voltage regulator configured with said separate electrical power interface associated with at least one of said at least one musical module requiring electrical power.

109. The musical instrument according to claim 106, wherein at least one of said at least one musical module requiring electrical power further includes a power distribution decoupling filter that is in electrical communication with said electrical power distribution infrastructure.

110. The musical instrument according to claim 106, wherein at least one of said at least one musical module requiring electrical power further includes a voltage regulator that is in electrical communication with said electrical power distribution infrastructure.

111. The musical instrument according to claim 1, wherein said at least one instrument interface is coupled with said mounting frame.



112. A customizable aggregated instrument comprising:  
a plurality of individual musical modules, wherein each musical module of said plurality of individual musical modules generates an electrical signal in response to user operation of said individual musical module;  
means for securing said plurality of individual musical modules in a reconfigurable mounting arrangement, wherein each musical module of said plurality of individual musical modules is readily positionable within any of a plurality of mounting locations; and  
means for transmitting interface signals to an external system, wherein said interface signals are generated in response to one or more of said electrical signals generated by said plurality of individual musical modules.

113. The musical instrument according to claim 112, said musical instrument further comprising:

a signal routing means facilitating signal communication required by said means for transmitting interface signals and each music module of said plurality of individual musical modules.

114. The musical instrument according to claim 112, said musical instrument further comprising:

an electronic controller module secured within one of said plurality of mounting locations of said reconfigurable mounting arrangement, and wherein said electronic controller module comprises a user interface means for producing at least one control signal in response to user operation of said user interface means.

115. The musical instrument according to claim 112, said musical instrument further comprising:

means for securing a novelty module within one of said plurality of mounting locations of said reconfigurable mounting arrangement, wherein said novelty module comprises an electrical interface for receiving incoming control signals.

116. The musical instrument according to claim 112, said musical instrument further comprising:

means for securing a novelty module within one of said plurality of mounting locations of said reconfigurable mounting arrangement, wherein said novelty module comprises an electrical interface for providing outgoing control signals.

117. The musical instrument according to claim 112, said musical instrument further comprising:

means for securing a hierarchical frame module within one of said plurality of mounting locations of said reconfigurable mounting arrangement;

means for securing a plurality of small-scale musical modules in a reconfigurable mounting arrangement within said hierarchical frame module, wherein each musical module of said plurality of small-scale musical modules is readily positionable within any of a plurality of mounting locations of said hierarchical frame module; and wherein

each musical module of said plurality of small-scale musical modules generates an electrical signal in response to user operation of said small-scale musical module.

118. The musical instrument according to claim 112, said musical instrument further comprising:

means for distributing electrical power to at least one musical module of said plurality of individual musical modules via a separate electrical power interface associated with each of said at least one musical module requiring electrical power.